

U.S. Patent Application Serial No. **09/939,716**
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

REMARKS:

Claims 10-17 and 19 are currently pending, of which claims 10, 13-17, and 19 have been amended herein. Claims 1-9 and 18 have been canceled herein without prejudice or disclaimer as to their subject matter.

The Examiner has indicated that claims 13 and 16 set forth allowable subject matter.

On page 6 of the Office Action dated May 21, 2007, the Examiner has suggested that U.S. Patent No. 5,644,664 (**Burns**) "teaches that the bandwidth of optical output of the Mach Zehnder light intensity modulator is restricted by using mismatching of phase velocity of electric wave ... propagating the traveling wave type electrode and optical wave propagating in an optical waveguide having refractive index depending upon electrical field generated by the electric wave."

However, Applicants submit that **Burns**, alone or in combination with the other references cited and relied upon by the Examiner, fails to describe, teach, or suggest the features set forth in claims 10 and 19, as amended. This shall be further explained herein below.

U.S. Patent Application Serial No. 09/939,716
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

Burns includes the following:

- (1) “The phase matching or phase velocity matching in the invention will now be discussed” (column 9, lines 42-43).
- (2) “FIG. 9 shows how well each of the three devices is velocity matched” (column 12, lines 17-18).

In view of the above, it is respectfully submitted that **Burns** does not teach the usage of phase velocity mismatch to restrict the bandwidth.

A. The Examiner has rejected claims 6, 7, 9, 14, 15, 17, 18, and 19 under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,543,952 (**Yonenaga**) and U.S. Patent No. 5,644,664 (**Burns**).

Applicants respectfully traverse this rejection, for the following reasons.

To establish a *prima facie* case of obviousness for a rejection of claims under 35 USC § 103, factual inquiries enunciated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), should be considered. *Graham v. John Deere Co.* indicated that the following factual inquiries are used to determine obviousness and nonobviousness:

- (1) Determine the scope and contents of the prior art;
- (2) Ascertain the differences between the prior art and the claims in issue; and
- (3) Resolve the level of ordinary skill in the pertinent art.

If the Examiner fails to establish a *prima facie* case, the rejection is improper and will be overturned. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

There are substantial, important differences between the art relied upon by the Examiner and the features set forth in the claims in issue.

Yonenaga and **Burns**, alone or in combination, fail to describe, teach, or suggest the following features set forth in **claim 10**, as amended: “bandwidth of optical output of said Mach Zehnder light intensity modulator is restricted because of loss of said traveling wave type electrode and by using mismatching of phase velocity of electric wave propagating on said traveling wave type electrode and optical wave propagating in an optical waveguide having refractive index depending upon electrical field generated by said electric wave,” in combination with the other claimed features.

Yonenaga and **Burns**, alone or in combination, fail to describe, teach, or suggest the following features set forth in **claim 19**, as amended: “said electrical-optical conversion means is a Mach Zehnder light intensity modulator provided on a substrate of X-cut Lithium-Niobate,” in combination

U.S. Patent Application Serial No. 09/939,716
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

with the other claimed features.

Applicants submit that it would not have been obvious to combine/modify **Yonenaga** and **Burns** in order to arrive at the features set forth in **claims 10 and 19**, as amended.

In view of the above, the Examiner has not yet established a *prima facie* case of obviousness. But it is the burden of the Examiner to do so. The U.S. Patent and Trademark Office has the burden of proof to show that an Applicant is not entitled to a patent because the claimed subject matter is anticipated by, or is obvious from, the art of record. A patent Applicant is entitled to a patent “unless” the U.S. Patent and Trademark Office establishes otherwise. See, e.g., *In re Dembiczak*, 175 F.3d 994, 1001 (Fed. Cir. 1999); *In re Epstein*, 32 F.3d 1559, 1564 (Fed. Cir. 1994); *In re Rijckeart*, 9 F.3d 1551, 1552 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988).

In view of the foregoing amendments and remarks, it is respectfully believed that essential elements of a *prima facie* case of obviousness are missing.

The art does not describe, teach, or suggest the combination of features as set forth in **claims 10 and 19**, as amended.

U.S. Patent Application Serial No. **09/939,716**
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

Applicants respectfully submit that the Examiner has not established a *prima facie* case regarding **claims 10 and 19**, as amended.

Accordingly, in view of the above, Applicants respectfully submit that this rejection of claim 19 should be withdrawn. Applicants respectfully submit that this rejection of claims 14, 15, and 17 should be withdrawn by virtue of their dependency. It is submitted that this rejection of claims 6, 7, 9, and 18 is moot.

B. The Examiner has rejected claims 8 and 10-12 under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,543,952 (**Yonenaga**), U.S. Patent No. 5,644,664 (**Burns**), and “Modeling and Optimization of Traveling-Wave LiNbO₃ Interferometric Modulators,” IEEE Journal of Quantum Electronics, Vol. 27, No. 3, March 1991 (**Chung**).

Applicants respectfully traverse this rejection, for the following reasons.

Yonenaga, Burns, and Chung, alone or in combination, fail to describe, teach, or suggest the following features set forth in claim 10, as amended: “bandwidth of optical output of said Mach Zehnder light intensity modulator is restricted because of loss of said traveling wave type electrode and by using mismatching of phase velocity of electric wave propagating on said traveling wave type electrode and optical wave propagating in an optical waveguide having refractive index depending

U.S. Patent Application Serial No. **09/939,716**
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

upon electrical field generated by said electric wave,” in combination with the other claimed features.

Accordingly, in view of the above, Applicants respectfully submit that this rejection of claim 10 should be withdrawn.

It is submitted that this rejection of claims 11 and 12 should be withdrawn by virtue of their dependency. It is submitted that this rejection of claim 8 is moot.

C. The Examiner has rejected claims 8, 10, and 11 under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,543,952 (**Yonenaga**), U.S. Patent No. 5,644,664 (**Burns**), and further in view of Applicants’ statement on pages 14-16 in the reply filed May 8, 2006.

Applicants respectfully traverse this rejection, for the following reasons.

Yonenaga, Burns, and Applicants’ statement, alone or in combination, fail to describe, teach, or suggest the following features set forth in claim 10, as amended: “bandwidth of optical output of said Mach Zehnder light intensity modulator is restricted because of loss of said traveling wave type

U.S. Patent Application Serial No. 09/939,716
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

electrode and by using mismatching of phase velocity of electric wave propagating on said traveling wave type electrode and optical wave propagating in an optical waveguide having refractive index depending upon electrical field generated by said electric wave,” in combination with the other claimed features.

Accordingly, in view of the above, Applicants respectfully submit that this rejection of claim 10 should be withdrawn.

It is submitted that this rejection of claim 11 should be withdrawn by virtue of its dependency. It is submitted that this rejection of claim 8 is moot.

D. The Examiner has objected to claims 13 and 16.

The Examiner has objected to claims 13 and 16 as being dependent upon a rejected base claim, and has noted that claims 13 and 16 would be allowable if rewritten in independent form including the limitations of the base claim and any intervening claims.

U.S. Patent Application Serial No. **09/939,716**
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

It is submitted that the objection to claims 13 and 16 is an objection or requirement as to form. Applicants respectfully request that the Examiner hold this objection in abeyance, while considering the amendments and remarks herein regarding base claim 10.

E. The Examiner has rejected claims 1-5 under 35 U.S.C. § 103(a) obvious over U.S. Patent No. 5,543,952 (Yonenaga).

Claims 1-5 have been canceled herein without prejudice or disclaimer as to their subject matter.

Accordingly, in view of the above, Applicants respectfully submit that this rejection of claims 1-5 is moot and should be withdrawn.

In view of the aforementioned amendments and remarks, all claims currently pending are in condition for examination.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the Applicants' undersigned attorney at the telephone number

U.S. Patent Application Serial No. **09/939,716**
Amendment filed August 21, 2007
Reply to OA dated May 21, 2007

indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due now or in the future with respect to this application, to Deposit Account No. 01-2340.

Respectfully submitted,
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